

Learning Goal: Students will understand how to graph sine, cosine and tangent graphs.



Graphing Trig Functions



Remember Bug on a Square Track?



In your notes, NEATLY **re-draw** the graph that represented the x-values of the bug's path.

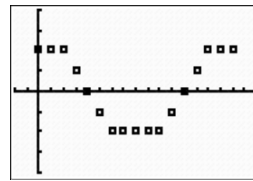
Then, NEATLY **re-draw** the graph that represented the y-values of the bug's path.



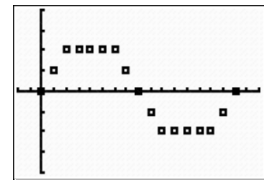
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Bug on a Square Track



x-values

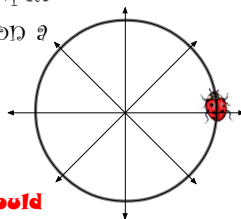


y-values

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How might our two graphs change if the bug was on a CIRCLE TRACK?

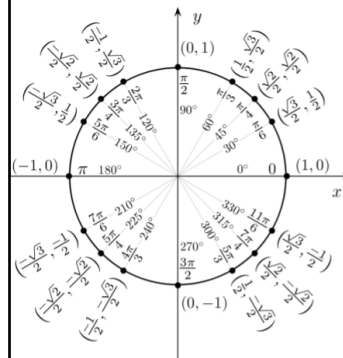


Draw a new graph that would represent the x-values.

And, another one that would represent the y-values.



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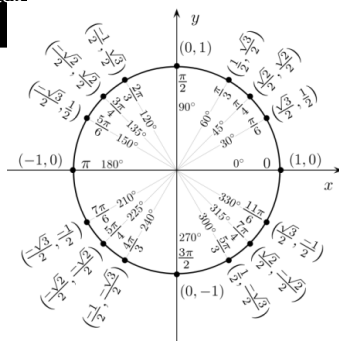
Using what we know about a **UNIT CIRCLE** how might we make an accurate graph?



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Which coordinate is associated with COSINE? (x or y?)

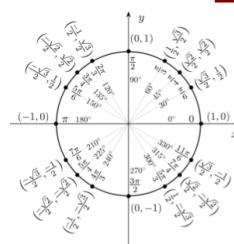
Cosine graph



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Cosine graph

Make a chart of the cosine values versus the angle measure in degrees.

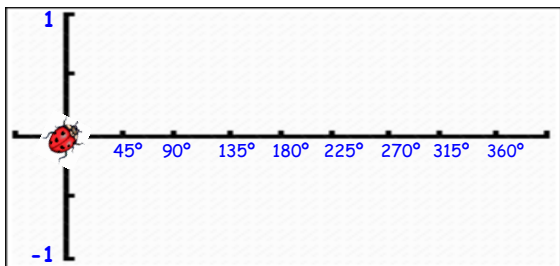


Make a chart like this one in your notes and fill it in.

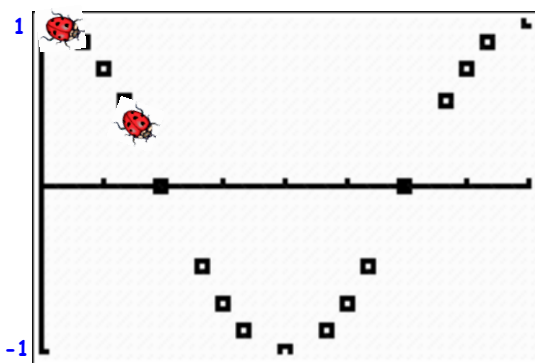
Degree	Exact Cosine value	Approximate Cosine value
0	1	1
30	$\sqrt{3}/2$	0.87
45	$\sqrt{2}/2$	0.71
60		
90		
120		
135		
150		
180		
210		
225		
240		
270		
300		
315		
330		
360		

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Now, make a graph based on the degrees and the approximate values of cosine that you found. Make sure your graph goes from 0° to 360° on the x-axis and between -1 and 1 on the y-axis.

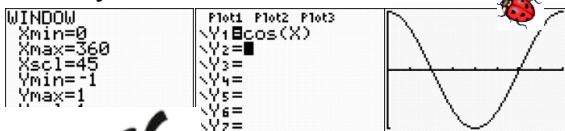


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Consult your calculator!



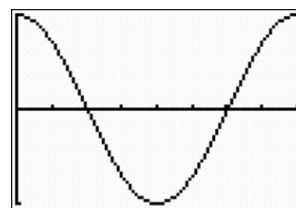
What do you see?

Use the **TRACE** key to explore the graph.

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Circle track vs. square track

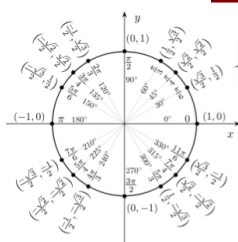
How are they the same?
how are they different?



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Sine graph

This time, we are going to create a sine graph using RADIANS!



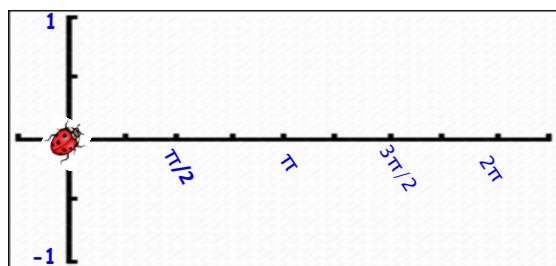
Make a chart like this one in your notes and fill it in.

Radian	Sin(θ)
0	0
$\pi/2$	
π	
$3\pi/2$	
2π	

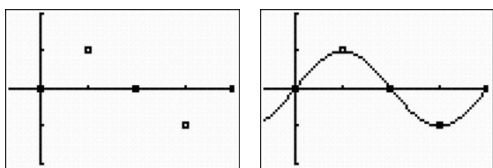
$$\sin(\theta) = y$$

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Now, make a graph based on the RADIANS and the values of sine that you found.



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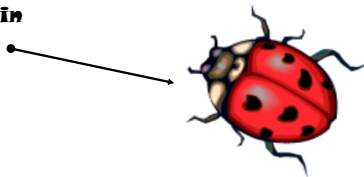


Circle track vs. square track

**How are they the same?
how are they different?**

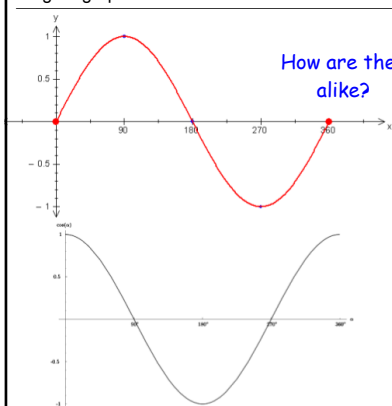
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**See my path in
real time!**



I'm a link!

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How are they
alike?

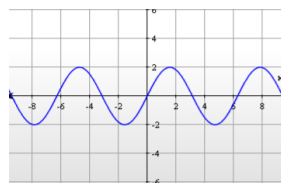
How are they
different?



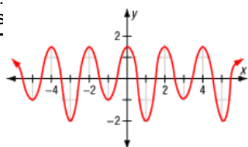
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**What would happen if the
bug kept going and going?**

Click
on the
graph!

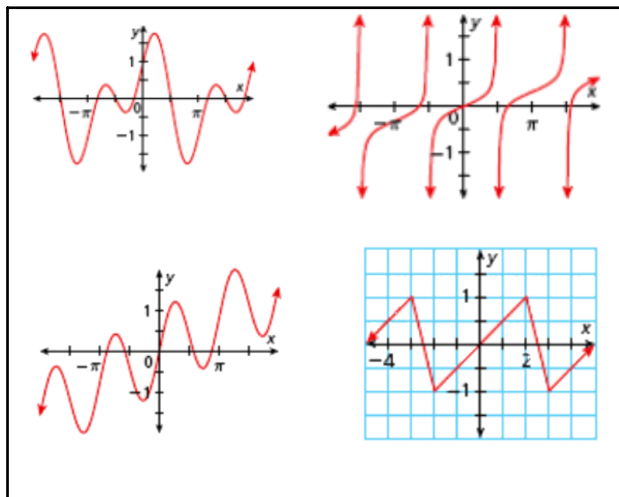
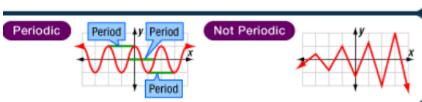


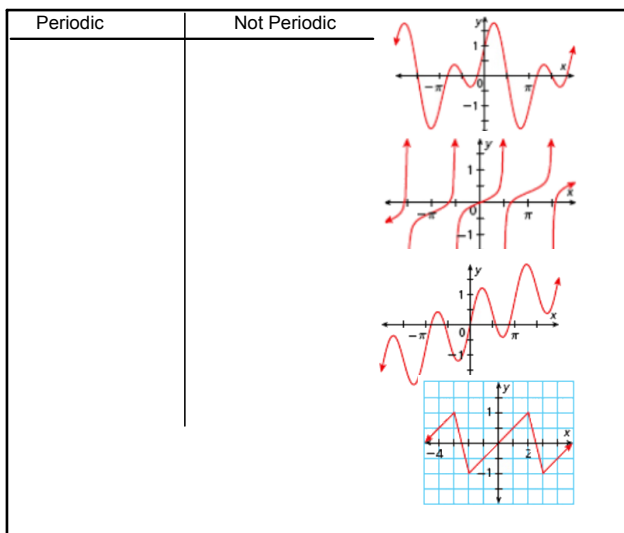
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Periodic

The pattern repeats exactly,
so the function is periodic,
with period 4.





Periodic	Not Periodic
	<p>Create two UNIQUE graphs...one that is periodic, and one that is not!</p>

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Ticket out....

Draw one full period of a cosine graph

- in radians
- from 0 to 2π
- Include 5 major points...



Fill in the tables for the tangent function (one in degrees and one in radians). Then make a graph for each. Describe what you notice.

degree	$\sin \theta / \cos \theta$	tangent value	Radian	$\tan(\theta)$
0	0/1	0	0	
30	$(1/2)/(\sqrt{3}/2)$.58		
45	$(\sqrt{2}/2)/(\sqrt{2}/2)$	1	$\pi/4$	
60				
90			$\pi/2$	
120				
135			$3\pi/4$	
150			π	
180			$5\pi/4$	
210			$3\pi/2$	
225			$7\pi/4$	
240			2π	
270				
300				
315				
330				
360				

Homework